



The Michigan Antique Radio Chronicle

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A QUARTERLY WRITTEN FORUM OF THE MICHIGAN ANTIQUE RADIO CLUB

VOLUME 34

Spring 2019

NUMBER 1



Ed Dupart's Junk Box Radio

See page 16 for details.

THE MICHIGAN ANTIQUE RADIO CLUB

The Michigan Antique Radio Club was founded October 19, 1985 at the Dillon Inn in Lansing, Michigan. Present at this historical meeting to found MARC were Jim and Brenda Clark, Larry Anderson, Karl Rommel, Mike Male, Dick Perry and John Kent. The purpose of the organization is to preserve the history and enhance the knowledge of radio, television, and related disciplines, with special emphasis on contributions originating in the state of Michigan. Dues for membership in M.A.R.C. are \$25.00 annually (US funds) and payable in January. Officers of M.A.R.C. welcome your membership, your questions and your personal contributions to enhance the service value, growth and activities of the organization. Terms of office for Board members expire concurrently with the summer EXTRAVAGANZA meet held in Kalamazoo, Michigan. Send Correspondence to MARC, 311 Wordsworth St., Ferndale, MI 48220. E-mail: president@michiganantiqueradio.org. Visit our Web site at www.michiganantiqueradio.org.

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THE MICHIGAN ANTIQUE RADIO CHRONICLE is a forum of the Michigan Antique Radio Club. It is published four times a year. Annual subscription fees and one classified advertisement per issue are included in paid membership dues. Articles of interest to collectors of items pertaining to vintage radio and television technology and communications are welcome. Reprinting, in any form, of individually copyrighted material published in this newsletter requires the permission of the author. If not cited with a "©", articles may be reprinted without specific permission but should include the name of the original author and publication. *THE MICHIGAN ANTIQUE RADIO CHRONICLE* is published in Brooklyn, Michigan. Circulation is dependent upon membership and exchanges. Currently, it approximates 600 copies. Articles and advertisements may be addressed to the Editor.

The Michigan Antique Radio Club is willing to assist in the sale of estate collections of antique radios and other collectable electronic items. For information, please contact either Mark Oppat at 734-455-4169 or Jeff Lilly at 246-602-7513.

EXTRAVAGANZA '19 will be held July 18—20, 2019 in Kalamazoo.

Note that this is a week later than previous years.

Perspectives

Spring is springing, while caps are popping, dial cord is snapping and tubes are shorting... so the darn thing still isn't quite right. Now's a good time to put down your solder pencils and your pliers, take a deep breath, and think ahead to summer.

Now is the time I give you all the advance word on the latest iteration of our big summer show, **EXTRAVAGANZA '19**, and let you all know that there have been a couple of big changes, hopefully ones that benefit you and benefit the club.

First, due to popular demand, **we will be offering OUTDOOR SELLING SPACES at EXTRAVAGANZA '19** this year, in addition to our usual indoor spaces in the air-conditioned Expo hall. The spaces will be located on the back side of the building, near the normal load-in point, which will hopefully allow access to the indoors (plumbing, food service) while giving the folks who prefer an outdoor selling space all the room and fresh air they need. You'll notice on the website, and on the paper sign-up form in the flyer, the new option to purchase an outdoor space. We're still working with the Expo center about the exact sizing, but as of this writing we plan on them being 10' wide and about 20' long-plenty of room to back your vehicle up and unload.

Please note that the Expo Center cannot provide any tables, tarps, or tents for outdoor spaces, so please bring your own. In case of inclement weather forecasts for the weekend of Extravaganza, you may switch your outdoor table reservation to an indoor table reservation, space permitting, by paying the difference in price up until 8:00 AM on Friday, July 19. After that, if you want to switch to an indoor space, we will have to ask you to pay full price. In any case, we cannot give any refunds for outdoor selling spaces due to weather-related problems. We thank you for your co-operation.

We've also changed the configuration of the indoor show. The Main Expo hall will be the same as always, but we're moving the auction, presentations, and contests into **Expo North** this year, instead of Expo South, and eliminating Room B in the other wing of the building. Expo North is more compact and this new configuration saves the club some money while hopefully making for a more intimate setting, and allowing people to more easily find the presentations.

The President's Reception will be Friday night, as usual, at the Four Points by Sheraton, where we have also reserved a block of rooms. By the time of the show, the Four Points will have completed a major renovation and upgrade. Prices are a few dollars more than last year but still a good deal. **The block of rooms is being held up until June 18, so please get your reservations in! Contact the Four Points directly for reservations at (269) 385-3922.**

I'd also like to remind you that the Expo Center has **outdoor camping and RV hookups** available. Pitch your tent or hook up your camper and rough it at **EXTRAVAGANZA**. Outdoor sites include secure fencing, electrical hookups, showers, restrooms, and trash disposal. **For more information or to reserve a camping / RV space, please contact the Expo Center directly at (269) 383-8778.**

Additional info will be uploaded to the website as we get it. To keep up, please be sure to check out our website. You can reach the site at **www.thevee.org** or **www.michiganantiqueradio.org**.

Here's hoping your spring is happy and successful, and your troubleshooting isn't troubled. We hope to see you all in mid-July in Kalamazoo for **EXTRAVAGANZA '19!**

Jeff



NOTES FROM THE SERVICE SHOP

No. 105

by John Reinicke

In Search of the Intermittent

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I do appreciate Betty's coffee and this morning it was proving to be particularly welcome. I had gotten a late start the day before and had arrived in Centerburg quite late in the evening. By the time I had dragged myself upstairs and into my sleeping bag, it was after midnight. This morning found me in the back office of Ken and Betty's antique shop before they opened for the day.

Ken, ever the observer, commented. "John, you must have had a late night. It doesn't look like you are all here this morning."

I chuckled and agreed that it had been a late night. I also expressed appreciation for the hot egg, cheese and sausage croissants that they had carried in from a restaurant on the square. We continued with our usual exchange of family gossip and stories. As usual, we agreed that, like the residents of Lake Woebegone, our grandkids were all of above average intelligence and looks.

I asked how their business had been doing and Ken was only too happy to explain. "Well, after the Holidays, things slowed down a bit and the nasty weather put a temporary stop to the tour busses

coming to town so things were quiet. Most of our staff these days is part time retirees and college students so I think they appreciated the break even if they missed the paycheck. Our college students have been concentrating on their studies and business should pick back up after they have completed finals."

I nodded in acknowledgement. "So, did the slow down give y'all a chance to do any interesting picking?"

"I am glad you asked!" Betty chimed in with some enthusiasm. "Bev, a realtor friend of ours, let us know of an interesting estate that she was getting ready to list. The family had just lost their matriarch at the age of 98. Apparently she had been quite a 'firecracker' and lived quite independently up to the end. As we have often encountered, the extended family all live out of state and just want things resolved as quickly as possible. Bev mentioned that the matriarch and her late husband had been collectors and that we would find the estate 'interesting'.

"So, Ken and I made arrangements to check it out. We have often encountered situations like this and we both anticipated a hoard of all manner of stuff

from junk to treasures. We were flabbergasted when we joined Bev at the house. In this case, they had done REALLY well in life. The house is huge by any standard and there are two outbuildings to house the collections in addition to what was in the main house. I won't even mention the horse barn, greenhouse and garden "shed". It was obvious; a staff maintained the estate. This was not a hoarder situation at all. There were multiple, well curated, collections. In addition to a selection of fine books, the library even had well-organized notebooks with documentation of the collections including considerable provenance for at least the prominent items. It took us an entire day to just get an idea of the scope of the collections.

"Our next step was to meet with the family to discuss how to deal with it. Some of the things, we usually don't deal in. For example, as much as I like horses, I don't want to get involved in the effort to find new homes for them. There was also a collection of some three-dozen cars. The deal we came to was that we would be the prime contractor for the disposition of the estate items. We bought a number of items outright and are in the process of making arrangements with a number of specialty auction houses for the remainder. So we now have our building south of town filled with enough stock for nearly a year and we have a temporary lease on another building to house the stuff headed for auction. We agreed with our friend Bev to leave select pieces of furniture so she could 'stage' the house for sale."

My response was a grin and "psheew, that sounds like a LOT of work!"

Ken responded. "Yes it is!" He gave Betty a knowing grin and continued. "We are honored to be invited to take on this

business and really do enjoy being temporary keepers of fine things."

I could hear a bit of 'qualification' in Ken's response and nodded.

"When we saw what we were getting into, Betty and I had quite a discussion. When you deal with the well healed, sometimes you encounter something of an expectation to be treated with diffidence and, frankly, folks like that can be a real pain to deal with. Our friend Bev assured us that this would not be the case with this family and so far all dealings have been quite pleasant. This has been really interesting and we have learned quite a bit as we researched the various auction houses for the collection. But, you know, I sort of miss the fun of getting really dirty going through an old barn with a leaky roof."

They went on to explain some of the more interesting items, or should I say artifacts, they discovered. The discussion was animated and they were a bit late in opening the store for the day.

With a fresh cup of coffee, I made my way to the attic, walked past the shelves of dusty radios, test equipment, and displays and made my way to the front to sit at the old roll top desk. I enjoyed the morning sun pouring in the windows as I sat back to read from the logbook and diary of one Clemmens Mettmann, the former owner of Centerburg Radio and TV that had occupied the building in years past. I stepped into Clem's time machine into the sixth decade of the 20th century.

Art was in a particularly good mood that Saturday morning, even if he was running a bit late. The night before, he had been up working DX and propagation conditions had been unusually good. He had managed to add four new countries

to his logbook and had been caught up in a 'rag chewing' session with a chap on a south Pacific island. He had enjoyed exchanging tales of what it is like to live where you are. The excitement of the contacts had him up into the 'wee hours' and he was looking forward to the coffee in the shop.

Art entered off the alley, and stepped into the shop. He hung up his jacket, grabbed his coffee cup and made a beeline for the pot. "Good afternoon, Mister Miller", was the friendly greeting from Clem. Art was usually in the shop several minutes before opening and being 15 minutes late was unusual – hence the kidding from Clem. Art smiled at Clem and, coffee cup cradled in hand, turned to go to his bench.

As he turned, he paused and whispered, "Wow, things have changed." Art was surprised to see the shop had been rearranged. A new bench had been added next to the 'play shelf' where finished radios played for an hour or so to confirm operation. In a back corner of the bench was a new instrument. He walked over to the new bench to take a closer look at the new instrument.

Gerry was just hosting a television chassis onto his bench and chimed in: "Your timing this morning is particularly good – if you had been in on time you could have helped us move things around."

Art looked over the rather fascinating addition to the shop. It was housed in a black crackle painted rack type cabinet with a lift top and was about the size of a Collins Receiver. The right side of the panel had three neat columns topped with indicator lights. Below each light was rotary switch, a toggle switch, another rotary switch and, at the bottom, a test lead connection with a 'universal'

type microphone connector. The left side had a meter centered at the top with a power switch, pilot light, fuse, push button and toggle switch all neatly underneath. Between the meter and the switches, it was labeled "Intermittent Recorder, Magne-Pulse Corp, type 202". Art turned to Clem with a puzzled look. "OK, I admit, I don't have a clue what this might be or why it is here."

Gerry turned to Clem to hear the response because he, too, was more than a little curious. He had helped with the shop rearrangement and had not yet asked what it was, anticipating that Clem was waiting for Art so he would only have to explain once.

Clem walked over to the new bench and as he did, Gerry joined him so he could see. Clem started his explanation. "As you both remember, Gretchen and I had taken the past week off so we could visit my cousin Lothar and his family in New York City. Lothar still has his big shop on Cortland Street and he still has a staff of two dozen. I always enjoy talking shop with him because we both have the same sort of business but he does it on a much grander scale. He is always on the lookout for ways to save work and make his technicians more productive.

"As we all know, intermittent problems can be a real bugger to find and we have all encountered one that has taken what seems like hours and hours to run down. This instrument is designed to catch intermittent problems. Magne-Pulse is on Nassau Street in lower Manhattan within walking distance of Lothar's shop. Lothar bought three of them and kept two for his shop. He set up two benches in his shop for the pair and his technicians have already made some use of them.

New

Intermittent recorder

Automatically Locates Intermittents

When trouble occurs, buzzer sounds, light goes on showing exactly where intermittent occurred.

Reduces Intermittent Servicing Time to Virtually Zero

Assures Fewer Recalls

Fool-Proof Trouble Locator

Easier to Operate than VTVM



Out of the extensive research and development on computers and guided missiles comes a revolutionary new piece of test equipment for television servicemen... the Magne-Pulse Intermittent Recorder* which automatically locates and records the stage in which an intermittent trouble occurs. NOW intermittent troubles can be easier to repair, requiring less service time—the Magne-Pulse recorder does all the work—and assuring fewer recalls because this fool-proof new instrument locates and shows you exactly where the fault is.

A companion to the much more costly Magne-Pulse Magnetic Transient Recorders used by large research organizations and government agencies throughout United States and Canada, this Intermittent Recorder was designed to specifically meet the needs and be within the price range of television servicemen.

Three monitoring lines are provided with this unit which can be used to check any stages within the television set and can be used to localize trouble down to an individual component. When a trouble occurs, the recorder instantly detects it and a buzzer sounds and an indicator lamp lights telling the repairman exactly where intermittent has or is occurring. An important feature of this set is that the indicating lamp continues to remain on even if trouble has disappeared again. Thus if the service man has left the shop or is working at some remote point, he will be informed that an intermittent has occurred and in which circuit. Operation of unit is extremely simple, merely connect three leads to three points in set and zero set meter.

* Trademark, Patents Pending

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Specializing in Magnetic Recording and Memory Devices

Clem pointed as he continued his explanation. "Of course, a problem with an intermittent condition is that you have to 'catch' it when it happens. This instrument had three test leads and you can connect one, two or all three to a suspect circuit or circuits. When you connect a

monitor test lead, you can select a positive or negative DC signal or an AC signal. You then use the meter to carefully 'zero' the reference to the measured signal. If there is a change in the signal it will sound a buzzer and light a light. That way you can put the set here on the



bench, connect the test lead or leads and walk away. You can work on another task and not spend your time waiting for a problem to crop up. It is also very clever in that if all three leads are connected, the one that detects a change first will light its lamp and 'lock out' the other leads. For example, if you are monitoring the RF amp, a point in the IF and the AVC line a problem in any of the three of them will upset the AVC Voltage. Since the instrument keys on the first change, you should be able to see where the problem started.

"While I was visiting Lothar's shop, they had a Motorola 16K2 TV on one of the benches. The customer complaint was that the picture would suddenly narrow after the set had been on for over an hour or so. Of course, when the repairman arrived at their apartment, it worked just fine. Since they suspected a problem with the horizontal drive, with the set on the bench, the most sensitive lead was connected to the grid of the

horizontal output tube. The other two leads were connected to the screen of the horizontal output and the cathode of the damper. The set was turned on and produced a very acceptable picture. It took almost two hours for the buzzer to go off. When the tech walked over to the set the picture had returned to normal but the light for the screen grid showed where the problem had occurred. The tech checked what was supposed to be a 6.8K resistor in the screen grid and found when he warmed it up a bit by holding his soldering iron next to it, it would first go to 10K and then vary from 6.8K to over 20K. Replacing the resistor fixed the problem. It should be noted that the resistor showed no visible sign of distress. It was not discolored or cracked and at room temperature measured very close to the proper 6.8K.

"The previous day, they had a Capehart CX-37 with the complaint the sound and picture would drop out intermittently but the raster remained. They

connected the leads to the video detector output, the tuner B plus and the output of the video amplifier. After some time the lamp for the video detector lit up and, thus, they deduced the problem had to be with the video detector or video IF. They left the first lead on the video detector and connected the other two to the plates of the second and third IF tubes. Again it took some time, but the light for the second IF came on and with that clue the tech found a cold solder joint on the plate lead of the IF transformer. That bad connection had been there since the set was built and I am quite sure it would have taken quite a long time to locate without the Intermittent Recorder."

Gerry had an approving smile. "Wow, boss, that is quite a 'Rube Goldberg'! We probably won't use it all the time, but when we need it, it sure looks like it will save a LOT of grief. It looks like it would be really expensive."

Clem nodded. "Yep, I suspect it was expensive. Lothar wouldn't tell me how expensive and I never question a really nice present, even when it is big and I have to figure out how to get it on the train. With the number of sets that his shop does in a day, it wouldn't surprise me if both of his see use more than once a week. Lothar said that he expects the pair, over the period of a year, will save enough time to count for a quarter of a technician. For what he has to pay in New York, that is a considerable savings."

Gerry tried, rather unsuccessfully, to look hurt. "Gee, boss, you mean your cousin pays more than you do?"

Clem gave him a bit of a dirty look. "Yes, he does and I'll bet you would find it wouldn't go as far as your pay does here in Centerburg." Gerry and Art both nodded enthusiastically in agreement.

"On that subject, by the way, we did have quite a discussion about doing business in 'The Big Apple'. He has a lot of competition and there are hundreds of shops in the greater area. Just a couple of years ago, television sets averaged around 1.4 service calls per year. That meant that we could expect a TV call from each of our customers around every 8 months. Throw in a bunch of radios and that made for enough work for hundreds of shops. Uncle Sam trained a lot of radio folks and after the war the boom in television made for enough work to go around as the GI's opened shops.

"As we have seen, newer television sets are a whole lot more reliable and I don't anticipate seeing any that we are selling now for two years. As a result, particularly in big cities like New York, frankly there are more shops than work. This has made for cutthroat competition and has brought out a few unscrupulous operators – the guys who lowball estimates and then charge for unnecessary work or, worse, charge for work not done. These 'bad apples' have made all of our customers wary and that means we really have to work extra hard to make our customers happy and keep their trust.

"Here in Centerburg, we don't have that competition and we have always been willing to expand into other areas of service. In the early days, I serviced auto generators and starters in addition to radios. This gave me contacts with car dealers so I took on auto radio repair. Gerry has his First Class Radiotelephone License and that means we can and do have a contract to service the Fire Department and Police and Sheriff offices. We repair public address systems and have even taken the occasional electron-

ic repair job from the Bessemer Plant, Edison, and the phone company."

Clem was looking at Art as he continued. "And speaking of new business, your friend Dave brought in his Hallicrafters amateur receiver for repair. I was a bit surprised. You amateurs tend to want to do your own repairs but I hardly ever turn down a radio repair."

Gerry and Art gave each other a knowing grin and Art responded. "Dave is one of the 'new' amateurs and although he had to pass a test of technical knowledge to get his ticket, he really isn't all that handy or inclined. Dave learned code in the Army. The Army sends coded messages in five letter groups and bunches of operators send and receive thousands of messages all broken into five letter groups. Those guys have got to be one hundred percent accurate in sending the messages and they can cruise along at something more than twenty five words a minute all day. Of course, they

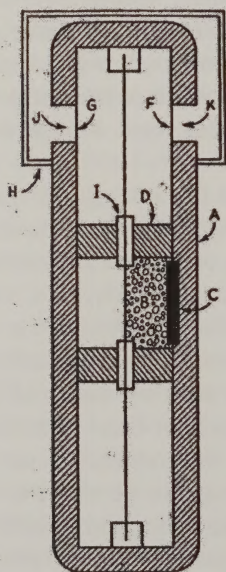
never have any idea of the meaning and because the letters are random they never learn actual words. Dave is really, really, good at code and has a great fist. His sending is really hard to distinguish from a practice tape. He actually enjoyed the time in the Army and decided to get his amateur ticket so he could keep up with his code. Dave's rag chew sessions are legendary – I think he could go 24 hours straight. Most of us do have to remind him to keep his speed down because when he gets going he speeds up and I am not sure even a machine could keep up." The three of them all got a chuckle out of Art's description.

"Ah well, enough of this joy and frivolity - back to work," Clem said as he headed for his bench.

The other two turned to their benches and as he turned Art spotted something interesting at the back corner of Gerry's bench. "And what might that be?" Art asked as he pointed.

Gerry followed his point and chuckled. "That is what is known as a lip microphone and headset. I was curious when I saw it for sale in the Fair Radio Surplus flyer. They were invented toward the middle of the war for use in really noisy locations and saw service in tanks, aircraft and ships. They were used primarily for intercom use such that the crews could communicate without shouting or communicate at all. The noise in a tank runs on the order of 115 dB which makes even shouting in your ear hard to hear."

Art picked it up and studied it as Gerry continued his explanation. "As you can see, it is made of molded Bakelite about an inch and a quarter square by 3/8" thick. It weighs about an ounce and three quarters. I know this because I found this article in "National Radio



Lip Microphone Detail



Fig. 1—Soldier equipped with lip mike and hearing-aid type earphones.

"It is interesting that it took so long for someone to come up with the idea. Prior to this, the military had been using throat microphones and, as anyone who has tried one found out, those sounded like a barely intelligible mumble. This microphone was invented by F. Cheyney Beekley of the American Radio Relay League. The actual manufacturing development was done at Electro Voice Corporation in South Bend Indiana by Chief Engineer Louis Burroughs and Engineer A. R. Kahn. On the Army side, the project was handled by Engineer H. C. Hornickel and Lt. Col. W. F. Soules, W9DCM, at the Fort Monmouth Signal Laboratory. We amateurs can be proud of our 'know how' even if we couldn't be on the air."

Gerry picked up the set and put it on his head. There was a strap over the top and back of his head and flat strips lead from the ears to the microphone just under his nose. "As you can see, the straps going to the microphone are very flat so I can still get a good seal for my gas mask." Gerry ran his fingers on the straps on each side of his face to make his point.

Art looked at Gerry with some alarm and puckered his face. "Boy, that sure doesn't look very comfortable!" Even Clem had to agree, it didn't look comfortable.

Gerry grinned. "Well, it isn't as bad as it looks and I expect that given the conditions in a tank the guy using it was glad to have it." They all agreed. Gerry slid the set off, rolled up the connecting cord, and put it back in the corner of his bench and went about getting ready to test the television on his bench.

Art walked over to his bench to discover he already had a pre-war Emerson set on his bench. The service tag said simply 'loud hum' and Art figured he

News" from December – January 1944 – 45." Gerry retrieved the newsletter from the shelf over his bench. "It works on the principle of differential pressure." Gerry pointed to the drawing in the article. "It is a standard carbon microphone housed in this small enclosure. There are chambers on both sides of the diaphragm with small openings to the outside. Sounds that enter both openings will cause an equal change in pressure on both sides of the diaphragm and the diaphragm won't move. But if the sound only enters one opening as would be the case if the opening were very close to your mouth, then the diaphragm would respond. Because the housing is so small, low frequency sounds, with long wavelengths, will always affect both sides and thus not cause a response. Since the noise in tanks and aircraft tends to be around 70 cycles this makes for particularly effective noise cancelation. The openings into the cavities are covered with a very thin rubber sheet to keep out moisture.

would shortly be replacing a filter capacitor. He plugged in the set and confirmed that it did, indeed, have a loud hum. Local stations were badly garbled but at least were there. Art pulled the knobs, took off the back, removed the screws on the bottom and slid the chassis out of the case onto his bench. To this point, he had not been giving the 6-tube set much thought. "What the devil?" He muttered under his breath. When he looked at the chassis he saw a loctal tube, a 7-pin miniature tube, and an octal tube with a grid cap. Since the tube layout and Riders manual both showed only regular GT type octal tubes the deviation was a surprise. Art stared at the chassis for a while and shook his head. He turned it over to inspect the bottom and found that all of the various connections were done quite professionally and all was tidy. The only clue, other than the unexpected tube types, was the three sockets on the 'odd' tubes were held in with bolts and nuts rather than the rivets that would have been used at the factory.

Clem had been watching out of the corner of his eye. He could see Art staring at the chassis and shaking his head. "I'll bet you would like to know the story about that set." He said aloud to Art. Art nodded in agreement. "That set belongs to June Fremont on Sumac. She has had that set for years and is quite attached to it. It is her only radio and she has what she calls 'just the spot for it'. I have tried to convince her to buy a new set, but, as I said, she is attached to it. You are probably noticing the odd tube complement." Art nodded in agreement. "Most of the work was done by Homer, who had your job a decade ago. During the war, all manner of stuff was on allocation and tubes and electronic parts were particularly dear. When a set came in, it was

not unusual for the required parts to be on allocation. To fix things in a timely fashion, we resorted to substitutions. Sometimes we had to use parts that we salvaged from old chassis.

"As you can see, that set has substitute tubes. In those days, if the set had a bad tube, at times we would not have the replacement on the shelf, and because of the allocations, it might be months before we could get another. As you might expect, a small shop in Centerburg didn't have the priority of a big shop that might be doing work that was deemed critical. So we resorted to the tube manual to see what we might have on hand, either as a new tube or as a good tube pulled from a salvage chassis."

Art walked over to Art's bench and would occasionally point to the chassis as he talked. "As an example, a 12SQ7 can be replaced with a 14B6 but you have to change the socket to accommodate the loctal tube. You can also use the older 12Q7 but that will require a connection to the triode grid cap and, as you can see on that set, a shield on the tube and wire to the grid cap. A 12AT6 7-pin miniature would work as well, again, with a socket change. The 7 pin tubes showed up after the war but did come in handy with the allocations during the Korean conflict.

"The 12SA7, pentagrid converter, can be replaced with a 14Q7. You can also use a 12A8 if you tie pins 6 and 4 together and, of course, use the grid cap. A 7-pin 12BE6 will also work.

For the 12SK7 you can substitute a 12K7 and run the grid to the cap. A 14A7 or 12BA6 can also be used.

"As a general rule, a metal tube like a 12SA7 can be replaced with its GT equivalent with a couple of considerations. There are some Zenith sets that may or may not work with the metal

tubes and in many cases, it will be necessary to add a shield to the GT tube. In the case of the 12SA7, one has to remember the suppressor grid is connected to pin 1 and is usually grounded. In the 12SA7GT, the suppressor grid is connected internally and there is no connection to pin 1. Most, but importantly not all, manufactures took this into account and grounded pin 1.

“As you would expect, anytime modifications of this magnitude are undertaken, the set must be properly aligned.

“For the 50L6 a loctal 50A5 will probably be satisfactory as will a 7-pin 50B5 or 50C5. The 35Z5 rectifier can be replaced with a loctal 35Y4 or the 7-pin 35W4. These tubes all have a tap for a pilot light. If the set does not have a pilot light, or the customer can do without a light, then 35Z4 and 35Z3 can also substitute.

“There were articles at the time on how to substitute 6 Volt tubes and accommodate the change to 300 milliamp rated filaments with series and parallel resistors but I simply wouldn't go that far. The resistors all had to be rated several Watts and that would add a lot of heat to a small cabinet. Plus, those high power resistors were also on allocation. On a radio with a power transformer you could substitute the 6 Volt versions of the tubes, which expands the possible alternatives.

“At the time there were even articles on how to rewind power and audio transformers and I remember trying it. The experiment was a success, and it got that Zenith back on line but I came to the conclusion that it was an awful lot of work and there was no way I could charge for all of the time required.

“There are times when a tube is simply no longer available, and if the set

is worth fixing, substitution is in order. My favorite in this regard is to use a 12AU7 to replace the Wunderlich detectors that were used in sets like the Scott Allwave 12. This requires the addition of a small filament transformer since the original has a 2.5 Volt filament. The two plates and cathodes are connected plate-to-plate and cathode-to-cathode and the two grids go to the original IF output. The 12AU7 hides under the original tube shield and the set appearance is unchanged – no one is the wiser.”

Art shook his head. “It sounds like you had to be really clever to come up with replacements back in those days.”

Clem had a slight grin as he responded. “I suppose we do have to be smarter than ‘the average bear’ in this line of work and that is what makes it fun. As television has proven, the job is getting more complex as well, and that, too, is all part of the fun. We have to realize we are part of a profession that requires constant updating of our knowledge and techniques which makes it really interesting.”

Gerry laughed, “Yeah, and it can be frustrating at times as well!”

Clem nodded and walked back to his bench with one hand pointing up. “Well, onward and upward we go!”

I sat back in my chair and decided it was time to refresh my coffee. As I made my way to the back of the attic I was scanning the shelves to see if I could find the Magne-Pulse instrument.

Authors note: I want to thank those of you who brought me some vintage literature at the winter meet. I expect you will recognize your contributions.



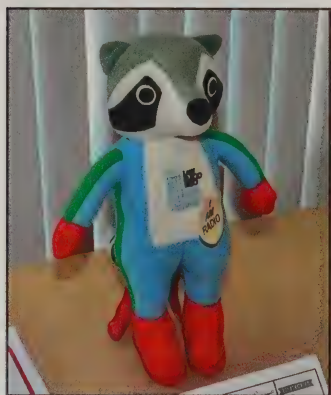
Farmington Hills Winter Meet



The RCA 45-EY-2, a 1952 45 record player displayed by John Reinicke, received first place in the Record Player category.



Second place in Record Players went to L. Muehlbrandt's 1990 Jensen JTA-220A compact stereo.



Dan Fox displayed an Amico Roni Raccoon 1990 Lake Placid Olympic novelty that took first place in Character Radios.



John Reinicke's Wesco BSR-1 Homer Simpson the C2000 won second place in Character Radios.



Character Radios third place went to a Radio Shack #12-465 displayed by Bill Simon.



The Open's third place went to L. Muehlbrandt's 1937 Kadette Tunemaster KRC-2.



First place in the Open went to Charley McKee's Supreme Radio Corp Diagnometer model 400B.



The Graetzor Granat, the very cool 1936 German radio displayed by William, received second place in the Open.



The Junk Box Subminiature Tube Radio

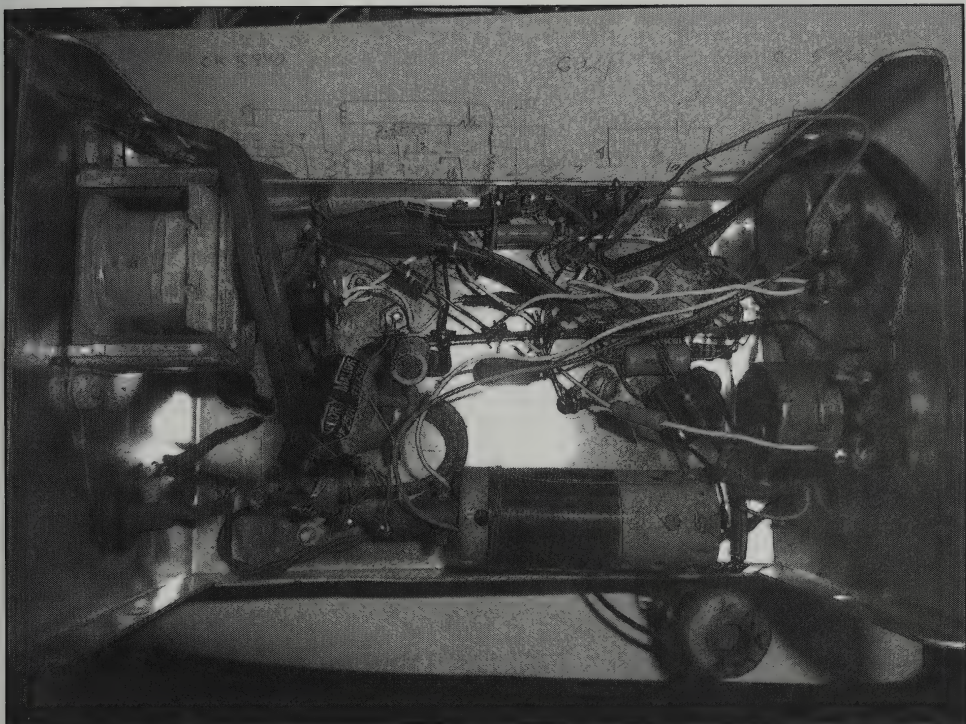
By Edward Dupart

Part 1 - The Circuit

About 60 years ago my brother Victor started giving me surplus electronic equipment and parts that he got at a nearby surplus place near where he worked in Detroit. Among some of that stuff were some subminiature tubes, two of them were 6021's, a dual triode and I made a radio with them and it worked pretty good. They were taken apart and the pieces were used to make something else, but I did keep the two 6021's. The iddy biddy tubes fascinated me and over the decades I wanted to do something with them. The 6021's and others like them are about .400" in diameter. Another collector thought I should build something with them and maybe give ideas to others that may have some of these little tubes lying around. I said, "OK, I will."

There was a lot for me to learn about these tubes and they were more than just dual triodes. There were diodes, triodes of various types, dual triodes, tetrodes, pentodes and beam power tubes. They ran on low voltages, 100 volts B+ or less, and many had the same heater voltage and current ratings as the larger tubes, typically 6.3 volts and the currents were .15, .3 and .45 amp. There are exceptions to this. These tubes were used by the military and industry and were very rugged and reliable. They could withstand high altitudes and high G forces that they would encounter in jet aircraft and missiles. I think they could even withstand the tortures a 5 year-old could give them. The date range I came up with was WWII through the early 70's, when obviously the transistor and IC's took over.





The hearing aid tubes are even smaller and ran on 45 volts B+ or less and the heater voltage could be 0.625 to 1.25 volts and 15 to 50 mA. My grandmother gave me two hearing aids when I was around 12 and they had the popular CK512AX and the CK533AX and I made radios with them. I still have those tubes as well. They measure 0.385 width by 0.285 thickness and 1.25 and 1.5" in length, respectively.

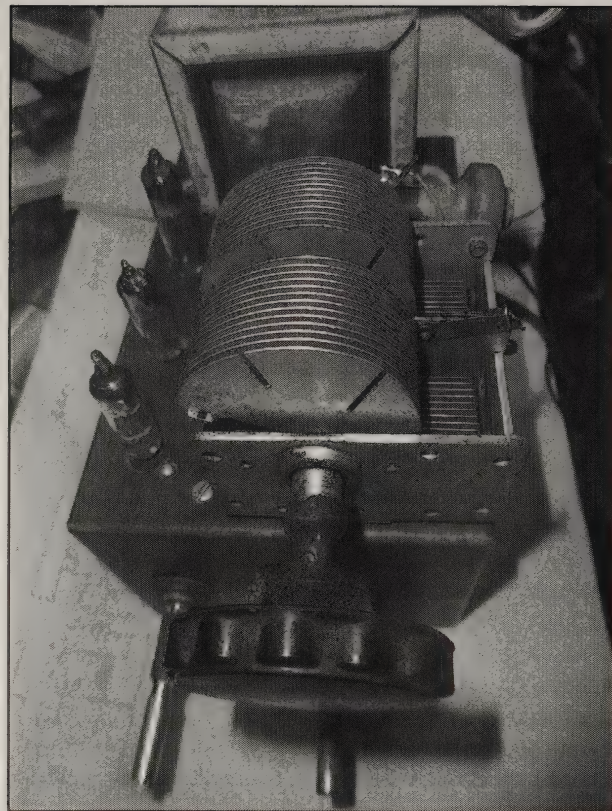
Are these tubes still being used today on a commercial basis? Yes they are. They are used as a pre-amp in high-end microphones, \$1000 is not unusual and they are in the microphone housing. A friend has one of these microphones and I was really surprised to see this tiny tube, a 5840 in the microphone. These are studio microphones. I also discovered music people like using them in low powered amplifiers for their guitars and there are a lot of schematics out there for amplifiers using these subminiature tubes.

So what was I going to build? I like radios so I decided on building a radio and I set my criteria:

1. It had to be cheap, so almost everything had to come from the junkbox.
2. It had to drive a speaker
3. It had to have a clear sound
4. The chassis had to be small enough to accommodate the Jarra wood I will use for the cabinet.
5. It had to be easy to use.
6. The circuitry had to be relatively simple, no more than four tubes.
7. It had to have a metal chassis.
8. I wanted to use one of my 6021 tubes.

What I came up with was a TRF similar to what was used in the depression 4-tube radios of the 1930's. A TRF has a cleaner sound than a superheterodyne, because it does not use a local oscillator that beats with the incoming signal. It takes a good ear to hear the difference

(Continued on page 18)



a 5902 so I bought the lot of them. It turns out there were about 40 tubes. Also, Raytheon likes to stick CK in front of their numbers, so a CK5840 is the same as a 5840. There are also European versions of these tubes.

The subminiature tubes came with long leads so that they could be soldered in place without using a socket. If sockets are desired just cut off the leads to a reasonable length and plug the tube into a socket. I had a couple of sockets but not enough and they were different, not matching, so back to EBAY and I found four sockets with very long leads, so I bought them. I wanted matching sockets that could be mounted to a metal chassis. I did not want to hardwire the tubes into the circuit, although I could have done that. What I

discovered was that subminiature tube sockets are pricey, but an 8 pin IC socket that fits a common 741 or 555 IC will work and would be ideal if one wanted to build this on a vector board. IC sockets are cheap and I considered using them, but mounting them to a metal chassis might be a problem, but not insurmountable. Hot glue anybody? If you are looking for sockets, don't forget to look at old military and industrial equipment that may have them. They could be treasure trove for you.

between a TRF and a superhet, but there is a difference. I thought of building something similar to the Knight Kit and Heathkit regenerative radios, but then I have a lot of dual gang variable capacitors I wanted to use and they are ideal for a TRF. That and I really wanted to keep my single gang 365 pf capacitors for crystal and transistor radios. So a TRF it will be.

I needed a couple of tubes to go along with my 6021 and I found that a 5899 semi-remote cutoff pentode and a 5840 sharp cutoff pentode could be used for my RF amplifier. A 5640 and a 5902 are beam power tubes capable of about 1 watt output, not bad for a tiny tube. These I did not have in my junk-box so now to obtain them. I looked on EBAY and somebody had about 30 of these subminiature tubes, mostly triodes but among them was a 5840, 5899, 5640 and

The chassis was my next problem. It had to be small enough for the scrap Jarra wood I'm going to use for the cabinet. I have some nice aluminum Bud chassis, but way too big and I found chassis on EBAY are very pricey so I went to the Dollar Tree and checked out some metal baking pans and they weren't the right size. I did have a Radio Shack (I miss

them) wood vinyl covered project box and that was the right size and I would use one half of it and the other half can be used for another project. So the project box is now my chassis.

Most of us have some dual gang 365-400pf variable capacitors kicking around, but the problem with most of them is that they have a 3/8" shaft and what is needed is a 1/4" shaft to fit the common knob. Why not attach a 1/4" shaft to it but how? I love JB Weld. In my junk-box I have saved cutoff shafts from controls that had too long a shaft that got down to size. I found a cutoff shaft of the right length and put the nice machined end of the shaft on top of the large variable capacitor and JB Welded it to it. I used the new quick set JB Weld that sets up in six minutes. It's not as strong as the regular JB Weld, but it doesn't have to be as strong for this job and I wanted the quicker setup time. The trick is getting the shaft perfectly centered and straight up and down so the knob doesn't wobble. I waited until the JB Weld got a little stiffer and just eyeballed it for straightness and then left it alone and it came out perfect. Now I have a useable variable capacitor.

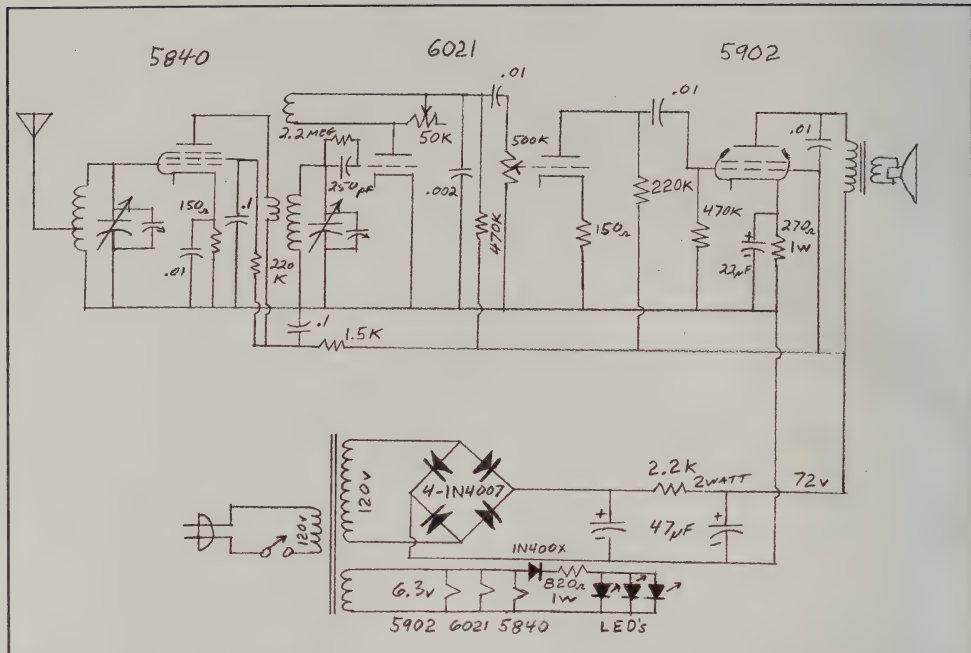
Finding a volume control was not a problem at all, but I decided to add regeneration to the circuit and I needed a 50K pot with a long shaft and I didn't have any. I did have a 50K pot with a short shaft so I headed for my junk box and found another chopped off shaft and I used a short piece of 1/4" tubing to join the two shafts together and it works perfect. Heat shrink would probably work just as well. The control issue is now settled and cheaply.

Powering this radio does not require a massive transformer and I had one with a 2-amp 6 volt winding for the heaters and a 120-volt secondary for the B+ and it was a smaller transformer. I settled on using three tubes and the heater currents

are: .15 amp for the 5840, .3 amp for the 6021 and .45 amp for the 5902 for a total of .9 amp, so the 2-amp transformer is sufficient. The 120 volt winding after rectification and filtering would yield about 150 volts and wouldn't take too much too knock that down to under 100 volts. Looking up the typical plate and cathode current for the tubes gave me an approximate total of about 60 mA and to reduce it to 100 volts would require about an 800-ohm resistor. I really wanted it under a 100 volts and settled on a 2.2K 2-watt resistor which gave me about 72 volts and the radio worked great at that voltage. I tried higher voltages but there wasn't any improvement. At this voltage things run pretty cool.

The coil between the RF stage and the detector came from an early 1930's radio and had a nice L shaped bracket on it that made it easy to attach to the chassis. Then I had to hand pick the antenna coil, one that would match the RF coil impedance wise and I settled on one that came from a 1950's RCA 3 way portable that had an RF stage. The coil has an adjustable ferrite slug and the external antenna is just a tap on the coil making the coil resemble an autotransformer. I mounted the antenna coil on the back of the variable capacitor. The tuning range for this radio is 500kHz to 1.7MHz, quite a span.

After building the radio I needed to attach a solder lug on the back of the variable capacitor and none of the holes were tapped with threads to accept a screw, so this is what I did. In my assortment of screws I found a metal tapping screw of the right size that required a 1/4" nutdriver which is ideal since the nutdriver won't slip off like a regular screwdriver could. Just screw it in slowly and back it out every few turns to clean out the burrs and screw it back in until it is all the way through. How about that! You've got threads without having to use a tap and



die set. Metal tapping screws taper a little bit at the tip and have a slot at the tip. See the accompanying picture.

My drill press worked great at accurately getting all the holes drilled where I wanted them. I used to use a hand drill but it likes to slip around, whereas the drill press is stable. I bought a cheap Harbor Freight drill press for around \$100 and it works great and is small and easy to store.

About the circuitry: the 5840 is used as my RF amplifier, and the 6021 is acting as a detector and the second triode is an amplifier driving the 5902 output stage. The 5902's are capable of about one watt of output but with my reduced voltage I'm guessing it's in the ½ watt range but is plenty loud enough for a small room.

After mounting all the parts I wired it and it didn't work. Stations came in faintly. Most of the subminiature tubes use pins 2,4, and 8 for the cathode and if they are hardwired they will clip off the unused wires on the tube. I only had pin two wired in the radio and they had pin two on the tube clipped, so I had to hook

up pin 4 on the tube socket and then the radio worked, but it oscillated with a short antenna but not with a long one. At this point it is a TRF without regeneration and so it should not oscillate. I determined the problem had to be in the screen grid circuit of the RF amplifier. I had the screen grid tied directly to the bottom of the primary of the RF transformer which is typical for the AC/DC radio, but there are a lot of IF and RF circuits where there is a dropping resistor in the screen grid circuit. I disconnected the screen grid and used a resistor substitution box and I discovered it worked great with a 220K resistor. The oscillation stopped and the sensitivity went up. What blew my mind was there was only 14 volts on the screen grid and 72 volts on the plate but the radio worked great.

As a TRF I was pulling in stations all over the dial, Nashville, Ontario, Chicago and many more and the sound was great. The only problem, which is typical with simple TRF's, is the selectivity is not good on strong stations and a strong station tends to block stations out for about +/-

40 kHz. So I added regeneration and that solved the problem and increased the sensitivity, I even picked up Mexico! I can set the regeneration at one spot and not have to adjust it again and seems to be good across the dial. This radio outperforms the Knight Kit and Heathkit regenerative radios that I have and sounds a whole lot better. It also outperforms the four-tube depression era TRF's I have and have had. This radio works best with a 3-5 foot antenna.

When I added regeneration to the radio I had to use a feedback coil. I could wind a few turns around the RF coil or I could use a pre-wound coil and in my box of coils there was a nice small 4.5MHz sound trap coil from a TV. It fit nicely inside the RF coil so I used the brightly colored solid wire telephone wire and soldered the leads to the coil and then across the regeneration control. The solid wires held the coil in place and it worked great! The ferrite adjustable slug was removed, as I didn't want it to change the inductance of the RF coil. To go along with the junk-box theme I used solid copper brightly colored insulated telephone wire the telephone people left behind. It's great hookup wire and works well for vector boards.

What I'm hoping for is those of you that have some of these tubes lying around collecting dust or for someone who is just interested in playing around with these tubes to try building something with them. Many of these tubes will operate in the UHF range so let your imagination run wild. Check out the Internet for some interesting circuits, there are lots of them.

Part 2 - The Cabinet

I built my junk box sub-miniature tube radio and it works nicely, but now I need to build a cabinet for it. I was able to get some Jarrah wood. In keeping with

the junk box theme, this Jarrah wood came from a company that makes outdoor furniture and they gave me the scraps, which I obtained from a friend of a friend who worked there. They gave me several pieces that were red, brown or tan in color so I made the top, two sides and the front from Jarrah wood. The back is made of Pine and the bottom is made of Chinaberry, a wood originally from the Himalayas, but is found in Texas. Jarrah wood is a very hard dense wood from Australia, and is insect resistant. For a bug to bite into this wood would be like for them to bite into concrete. Red, brown and yellow colors can be found from the same tree. Cutting the brown wood gave me red/orange sawdust and planing the same piece of wood gave me mustard yellow sawdust and red/orange shavings. A strange wood to work with, but also beautiful.

I gave a couple of pieces to my brother in law who likes woodworking and he discovered that when he cut a piece in two that it took the set completely off the band saw blade and had to replace the blade. He needed to cut a hole in one piece and used a hole saw for making holes in a door and when he made the hole he got sparks from the bit. This gave me a clue just how hard this wood is.

I built the radio cabinet front and sides from one brown piece that has yellow in the grain and was about 2 ¾" thick and about 8" x 7". I used a table saw with a carbide-tipped blade to slice this chunk of wood and it did slow the saw down somewhat so I had to go slowly, but it did a good job. The table saw blade couldn't slice through it completely so I used an Amish sharpened hand saw to complete cutting through the wood and the hand saw did a good job. Once I got my three pieces cut then I was ready to put it through the planer. Since this wood is so hard I would only shave small

amounts at a time, but taking my time paid off. The wood is so hard that when it came through the planer and table saw the edges and tops were extremely smooth and required very little sanding. I didn't have a piece of Jarrah wood big enough for the base so I used Chinaberry, another exotic wood. It was very red and yellow and didn't go with the brown Jarrah wood, so I used a can of black and a can of brown paint sprayed together that created the dark brown I wanted and it looked good. Next I drilled the holes in the base and the pilot holes in the sides and I tried putting the brass screws in to hold the sides to the base and the screws snapped in half. I used side cutters to get the broken screws out. The pilot holes had to be drilled out to match the diameter of the screws, and then the screws went in. Everything fit together well, but I took the screws back out and I made a channel in the two sides for the front to slide down into.

The holes for the tuning, volume and regeneration were located and using new auger bits I drilled the holes for them. There was no chipping, the edges were smooth and the inside of the hole was smooth, rather amazing. Drilling the speaker holes was a different story. I wanted a flower pattern for the speaker with four 1" holes and five smaller holes. The smaller holes were 5/8" and no problem drilling them, but the brand new 1" bit would only go down about 1/8" and began to chatter and would not go any further. Even after I drilled a 5/8" hole, the 1" bit would not go any further. So my speaker grille area has nine 5/8" holes with four of them with 1" depressions and it looks good. This wood is so hard I decided to try and use a metal tap and thread the holes for mounting the speaker and actually use metal screws. I couldn't believe it; it took considerable effort to get the metal tap to make threads in this wood! But it worked and

when I mounted the speaker there was no sign of the screws stripping the wooden threads.

Regarding the hardness of Jarrah wood, while it is not the hardest wood it is harder than our northern hemisphere woods, like oak, maple and hickory and many others. There is a Janka scale used to determine the hardness of woods and is rated in pounds-force. The test is to measure the force it takes to embed a .444" ball to half of its diameter in wood. Basswood is 410, Oak is 1220, Maple is 1450, Hickory is 1820, Jarrah is 1860, Brazilian ebony is 3690 and the highest is Lignum Vitae at 4380. There are many other woods harder than Jarrah and most come from Australia, Africa, Central and South America.

After drilling the holes I put slots, using the table saw, at the top of the two sides so that I could slide a piece of Plexiglass or glass and use that as a top. Then I sanded the sides and the front and used a clear lacquer on it and the wood immediately turned into a beautiful dark brown with a maroon cast to it. The yellow in the grain disappeared.

I made the back out of cheap pine and painted it a flat black. Drilling holes in it was like going through butter. Drilling pilot holes in the Jarrah wood is a necessity. I forgot to mention that when I drilled holes in the Jarrah wood I would usually get some smoke from the bit.

The dial was made on the computer and I initially printed it on plain white paper and then put it on the radio cabinet and marked the various frequencies where stations came in and marked it with a pencil. Then I printed the lines and numbers using the computer and printed it out. I placed the dial on the radio and made sure it was accurate. My wife and I looked through different colored papers and chose on a light pink for the dial, so I printed it out and sandwiched it between

and 1/8" piece of plastic and a thin piece of plastic that one commonly gets with packages nowadays. I drilled three 1/4" holes for LED's to light the plastic dial and that worked out well.

I put the radio and cabinet all together and it looked nice and worked well, but it just needed a wooden top. I didn't have a brown piece of Jarrah wood long enough or wide enough for the top so I settled on using a 7" piece of reddish Jarrah wood and a 1" wide piece of tan Jarrah wood for the top. The edges were so smooth when I cut it with the table saw that I didn't need to touch up the edges, but I did countersink holes in the 1" piece and drilled pilot holes in the larger piece. Then I used old fashioned steel wood screws and glue to hold the two pieces together. After the glue dried I did run it through the planer to make sure the top and bottom surfaces were smooth and matched. A router was used to do the edges on the top and bottom pieces and the Jarrah wood went through the router nicely giving a smooth surface with little sanding needed. Even though the top was Jarrah wood the reddish color just clashed with the sides and the front so I stained the top to give it a more dark brown color, but I left the inside natural so one could compare the colors of this wood. I put hinges on the top and a string attached to the cabinet and to the top so the top could only open so far. The top is finally done and looks great on the radio, better than just a piece of Plexi-glass for the top.

To mount the chassis to the cabinet and keeping with the junk box theme I used four used solder lugs. The kind where there is a hole on one end for a screw and a small hole on the other end for soldering wires to. What I did was solder the wire ends of the lugs together make a 90 degree bend and screw one end to the chassis and the other end to

the cabinet bottom, and I did this at the back and front of the chassis.

Finally, this cabinet is done and I think it looks great! Of course, I am a little biased.

Part 3 - The LEDs

I decided that my junk-box sub-miniature tube radio needed pilot lights and I wanted it to light up the dial, but what should I use? The old fashioned #47 or #46 pilot lights would work OK, but they generate heat and consume a fair amount of current. Then I thought about using LED's and the original red, green and yellow ones come to mind, but I didn't want colored lights and I wasn't sure they would be bright enough. Sitting next to me was one of those freebee Harbor Freight LED flashlights that belonged to someone else and they gave it to me because it became intermittent. He left the batteries in it too long and they leaked, but the LED's worked fine and they were white and very bright. Out came the current meter and I discovered they drew about 27mA individually and were intensely bright, too bright, but at 3 volts it drew about 2-3mA and was a useable brightness. Three LED's, one at each end of the dial and one in the middle was what I wanted, so I hooked three of them in parallel and ran them at 3 volts and the three of them drew about 7mA, had equal brilliance and were still quite bright. It was hard to believe they put out so much light with so little current. No wonder these LED flashlights can run with the batteries half dead! So it was settled, white LED's it will be.

The 6-volt filament winding from the power transformer is the ideal power source for my LED's, but it is AC. I could apply the AC to the LED's but that would mean on one half of the AC cycle there would be reverse voltage of about 9 volts and I don't know what the PIV rating is for these LED's so I decided to rectify and

(Continued on page 26)

The LanSing Radio

By David Pfaff

The LanSing radio was marketed by the United Engine Company of Lansing, Michigan, in the era of 1929 to 1931 according to the Lansing City Directory. United, headquartered in Lansing from 1912 to 1931 was a distributor of stationary engines and various farm related equipment. For most of this period they were located at 719/721 East St. Joseph Street. While there were a number of manufacturers of stationary engines in Lansing, the most well-known being Olds, Novo and New-Way, there were also companies located here that only sold engines, manufactured by others, which they marketed under their own trade names. Perhaps the distributors located here to take advantage of Lansing's reputation as a center of well known and respected stationary engine manufactures.

By the 1930's, the stationary engine business had started to decline as more and more farms, the biggest market for these engines, had connected to the expanding rural electrical grid with electric motors replacing the gasoline fueled engines. In addition, the depression had hit full force, especially impacting farmers. In the same time frame, the home radio was all the rage. United Engine

jumped on this trend, again not as a manufacturer, but as a marketer of home radios, using the trade name of "LanSing". There is no known evidence that United was involved in manufacturing of the radio in Lansing or elsewhere. Actual examination of a United radio would probably reveal the actual maker of the unit.

The radios were available from basic table-top units to elaborate furniture style floor models. Seven and eight tube models were available, designed to operate on 110 volt AC, 60 or 30 cycle power. Floor models were priced from \$99.75 to \$207.50, a lot of money during the depression. The top line model featured "hand carved ornamentation and skillfully matched Burl Walnut Sliding Doors and Front Panels". A Rola Magnetic Speaker was featured; a Rola Dynamic Speaker was optional for \$17.50 extra. These units are sought by early radio collectors.

This article was previously published in the Fall, 2008, "Spirit", the newsletter of the R. E. Olds Transportation Museum, Lansing, Michigan.

Dave Pfaff is an historian at the R. E. Olds Transportation Museum.

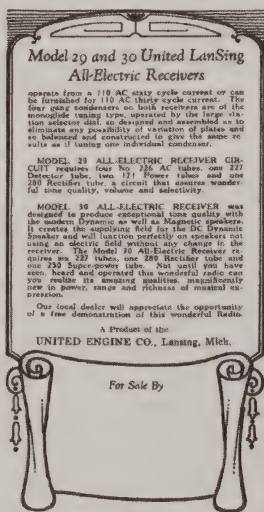


United LanSing Radio Model 30-125

List Price Complete **\$207.50**
Less Tubes

Consists of rare beauty and quality were necessary to uphold the remarkable selectivity and volume of the Model 10 Receiver, and the wonderful tone quality of the Rola Magnetic Speaker, the standard equipment of the No. 125 Complete. Richness is imparted by the hand carved ornamentation and the skillfully matched Burl Walnut Sliding Doors and Front Panels. The Complete stands 48 inches high, 28 inches wide and 18 1/2 inches deep.

If Rola Dynamic Speaker is wanted add \$17.50 to the above list price.



Model 29 and 30 United LanSing
All-Electric Receivers

operate from a 110 AC sixty cycle current or can be furnished for 110 AC thirty cycle current. The four easy condensers on both receivers are of the monoxide tuning type, operated by the large station selector dial, so designed and assembled as to eliminate any possibility of variation of plates and so balanced and constructed to give the same results as if tuning one individual condenser.

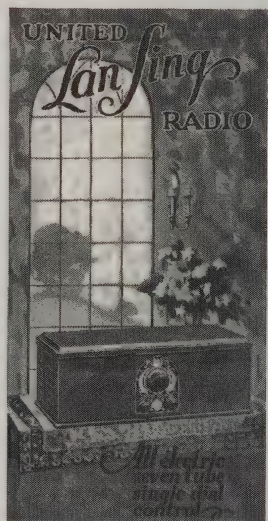
MODEL 29 ALL-ELECTRIC RECEIVER. CUC-ULL requires four No. 225 AC tubes, one 227 Detector tube, two No. 125 Rectifier tubes and one 280 Rectifier tube, a circuit that assures wonderful set tone quality, volume and selectivity.

MODEL 30 ALL-ELECTRIC RECEIVER was designed to produce exceptional tone quality with the Rola Dynamic Speaker, as well as Magnephone. It centers the amplifying field for the DC Dynamic Speaker and will function perfectly on speakers not using an electric field without any change in the receiver. The Model 30 All-Electric Receiver requires one 227 tube, one 280 Rectifier tube and one 225 Super-power tube. Not until you have seen, heard and operated this wonderful radio can you realize its amazing qualities, magnificently new in power, range and richness of musical expression.

Our local dealer will appreciate the opportunity of a free demonstration of this wonderful Radio.

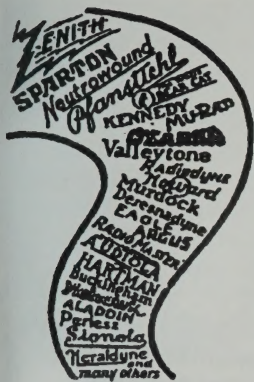
A Product of the
UNITED ENGINE CO., Lansing, Mich.

For Sale By



UNITED
LanSing
RADIO

All electric
receiver with
125 tube, 280
rectifier, 225
detector



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REPAIR SERVICE: I repair all tube type radios. I have most parts and tubes in stock. Dan Schnaidt, 325 Milton Ave., Battle Creek, MI 49017, 269-282-1324 (home), 734-417-6995 (cell).

FOR SALE: ARBE-III, Universal Battery Eliminator, \$159.95 + \$15 S/H. Michigan residents, please add \$9.00 sales tax.

The ARBE-III is designed to provide the power requirements for most pre 1930's battery operated radios. The custom wound power transformer provides 3 electrically isolated supplies (A, B, C) which are all regulated and short circuit proof. Comes assembled, tested and with a full five year warranty. Please refer to our website at www.arbeiii.com for direct purchase using PayPal. You can contact me at 517-787-2985 for details on money order or personal check payments. We are also offering custom wound audio transformers for early radios. \$19 each or \$20 each for the center tapped version plus S/H. See our website for other items offered. You can reach me at arbeiii@yahoo.com.

FOR SALE: PARTS! We have a full stock of radio supplies, including capacitors, tubes, knobs (including our two types of real wood repros!), bulbs, tube shields, etc. Our two specialties: repro radio dials (we bought the former Clint Blais repro dial business in 2003, and they are still the best!) and we can duplicate or repair most old volume or tone controls. Phono needles, carts and wheels too. Email any wants or see our website at

www.olderadioparts.net Over 30 years servicing radios here! Mark Oppat moppat@comcast.net 253 Blanche St, Plymouth, MI 48170 734-455-4169 11am-9pm most days.

FOR SALE: 1% Precision tolerance 500V silver mica capacitors and 1% Precision 630V tubular axial PSA polystyrene film capacitors. Also for sale are 1000 Volt silver mica capacitors available in many different pF sizes. All capacitors are new production. For price list and product info, please contact Dave Cantelon, 6 Ferncrest Gate, Scarborough, Ontario, Canada, M1W 1C2 ; phone 416-502-9128; Email: justradios@yahoo.com or visit WebSite: www.justradios.com

FOR SALE: – Repro Antique Radio Dial Covers – Mark Palmquist - Retro Radio Repair www.dialcover.com 5033 Arbor Ln, Lilburn, GA 30047 (770) 923-8929 jmpalm@mindspring.com.

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FOR SALE: 1955 Lowery Double Key Board Electric Organ with beautiful Mahogany Cabinet, 55 tube unit, very powerful in its day, \$400.00 selling as is. Variety of older ham tube equipment. Quite an assortment of ham magazines, 1970-1990s. Battery radios from 1920s, no horns but complete. Variety of transmitting tubes: 807, 866, 832, 815 etc. Portable Bakelite and wooden TVs early 1950s. **WANTED:** Kennedy console or table model radio. Can be rough needing work or restored if price is right. Phone Gary Clayton, The Olde Tyme Radio Centre, Belgrave, Ontario, Canada NOG 1E0, 519-357-4304, oldetymeradio@tnt21.com, <http://www.oldetymeradio.ca/>.

FINDER'S FEE: I am willing to pay a \$100 finder's fee to the first person who can provide me the whereabouts of the Reuben Smith 5-tube TRF battery radio with a glass front panel (circa 1925) manufactured in Lansing, MI that I traded off to

the late Oran Sauder of South Lyon, MI perhaps 25 or more years ago. Jim Clark, 517-648-2785 or jc072651@aol.com. Thank you.

FOR SALE: 1924 All American Mohawk Model-100 Battery Radio, good condition \$80.00; 1939 Howard Shortwave Receiver \$40.00; 11 Replica and Novelty Table Radios, Cathedrals, Jukebox, 1957 Chev, etc all for \$85.00; Bud VFO with coils \$20.00; Zenith Semi \$15.00; A Few misc Table Radios \$5.00 and under; Radio Related Literature, including Radio Boys. Over 30 misc Radio Magazines between 85 and 90 years old. Pick up only. Alan Reed, 2875 Geneva Hwy, Manitou Beach, MI 49253 517-547-7570 Evenings.

WANTED TO BUY: Your old capacitors, new or used (prefer with leads). All types: Wax, plastic, molded, striped, metal shell, disc, etc. These can be from your radio restorations, junk box, or vintage 1940-70s new old stock. Will pay shipping as well, or I can pick up in Kalamazoo at Expo 2017. Dan Gutowski 734-718-7450 email: dg16ms26@msn.com.

(Junk Box Radio, continued from page 23)

filter the 6volts AC. So now for a little math in determining the peak voltage. 6.3 volts times 1.414 gives me 8.9 volts peak and I rounded it off to 9 volts. With a 1N4007 diode, and a filter capacitor my output voltage would be approximately 9 volts DC, neglecting the diode drop. In real life it did measure 9 volts. What I wanted was 6 volts across a dropping resistor and 3 volts across the LED's at 7 mA. Using ohm's law, dividing 6volts by 7 mA gave me 857 ohms. The closest commercial value is 820 ohms and I had a nice looking 820 ohm one watt resistor in my junk box of resistors and it was within tolerance. How hot will my resistor run? With 6 volts across the resistor and 7 mA flowing through it and by ohm's law, $P = E \times I$, 6 volts times 7 mA gives me a whopping 0.042 watt. With this little power

this resistor will never heat up. I built my power supply on a terminal strip and mounted it inside on the bottom of the cabinet and ran wires from the filament winding out to the terminal strip. I hooked it up to my LED's and it measured 7 mA at 3 volts and was plenty bright with equal brilliance.

How does it look? The dial consists of a 1/8" thick piece of plastic, the paper dial and a thin protective piece of plastic over the paper dial. I turned it on and I see three little white dots that do illuminate the 1/8" thick piece of plastic and with the three little dots one knows if it's on or not. At night the dial is lit up enough that one can see the numbers on the dial, which is what I wanted. These are the coolest (literally) pilot lights! So don't throw that freebee LED flashlight out! Use those LED's!





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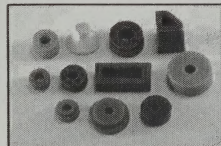
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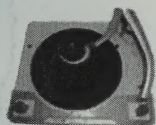
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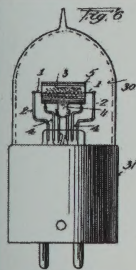
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